



September 29, 1956

VOL. 70, NO. 13

PAGES 193-206

# SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



**Bubbles for Atoms**

**See Page 197**

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Week in Headlines

Bi-W

MIDDLE EAST

## UN Condemns Israel

The UN Security Council unanimously adopted Jan. 19 the Western-sponsored resolution condemning the Israeli raid on Syria Dec. 11, 1955. The measure adopted by the Council charged Israel with "a flagrant violation of the Council's 1948 Palestine

**THIS CUMULATIVE INDEX  
EVERY OTHER WEEK**

Govt. agencies see under U.S. GOVT.  
For specialized United Nations agencies see under UNITED NATIONS.  
For foreign cities see under country concerned.

ALLEN, George Venable  
Delays on Israel arms sale 3-28, 111F1  
ALLEN, Harry  
British executioner 3-31, 121G1  
AMERICAN Assn. of University Professors  
Censures calls for  
121A-B1 Prof.  
AMERICAN Far  
Shuman vs far  
AMERICAN Rad  
lary Com

Lapp on fallout danger  
Gramys for H-test hel  
6th Sov in 8 mos repo  
Brit sets for May 4-3,  
& other  
plant 3-

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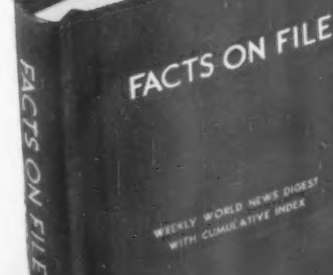
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## RADIO ASTRONOMY

# Radio Waves From Mars

**Scientists at Naval Research Laboratory pick up radio signals from Mars just after its close approach in early September. The planet is the third heard broadcasting radio waves.**

► RADIO WAVES from the planet Mars have been detected for the first time by a team of scientists at the Naval Research Laboratory, Washington.

Based on 50 recordings of these waves made during two clear nights just after Mars had made its close approach of 35,120,000 miles in early September, they calculate the red planet's temperature as a whole averages just below the freezing point of water, which is 32 degrees Fahrenheit.

This is about the temperature expected from optical measurements.

The observations were made at a wavelength of three centimeters (about an inch and a quarter) with the 50-foot NRL saucer-shaped antenna, a giant receiver for radio waves from space. They were obtained by the same team of scientists, Corneli H. Mayer, Timothy P. McCullough and Russell M. Sloanaker, that first found radio waves from Venus in June. (See SNL, June 16, p. 374.)

The radio waves are caused by the planet's heat, as are those from Venus. Another class of radiation in the radio wavelengths, believed caused by thunderstorm-like activity in the atmosphere, has been detected from Venus, and also from Jupiter.

Mars is thus the third planet to be heard broadcasting radio waves.

Scientists expect also to hear from Mercury and Saturn.

The Martian radio signals are considerably weaker than those from Venus, and quite a bit of mathematical analysis was required to show that the noises recorded by the 50-foot antenna came from Mars.

The radiation emitted by Venus is sufficiently intense so that the signals picked up in the telescope's dish, when converted electronically to activate a pen recording on graph paper, could easily be recognized. Martian radiation was so much weaker that, only by taking a minimum of 25 readings, then averaging the results, could the planet's radio signals be detected.

This method cancels the random background noises also picked up by the antenna. Using 50 recordings increased the evidence of the Martian signals statistical methods showing the chances were 10,000 to one the effect was real.

Another team of scientists from NRL tried to pick up the radio waves at 1.86 centimeters, or a little less than half an inch. Their attempt was thwarted by clouds that absorbed any possible radiation. Good luck with two clear nights gave the second team their success.

Radio scientists at Ohio State University, Carnegie Institution's Department of Ter-

restrial Magnetism and Harvard College Observatory have also been training their antennas on Mars in the hope of picking up radio signals.

Science News Letter, September 29, 1956

## METROLOGY

## U. S. Length Standard Found Still Unchanged

► THE NATIONAL STANDARD of length, a meter bar of platinum-iridium alloy, has been checked in Paris against the international standard and found unchanged, Dr. Allen V. Astin, director of the National Bureau of Standards, has announced.

Because of the bar's great value to science and the difficulty of replacing it, Dr. Lewis V. Judson of the Bureau personally carried it to Paris for the accurate comparison of the two lengths. The national

length standard has been checked only three times in 65 years.

The standard meter is defined as the distance between two parallel lines on the bar at the temperature of melting ice. Indirectly, it determines the length of a yard of cloth and allows assembling complex machine parts made by different contractors.

The value of the alloy contained in the meter bar is about \$10,000, but the actual value of the meter bar is much greater. Because it is the national standard and practically irreplaceable, its true value can scarcely be estimated.

The standard meter bar is ordinarily kept locked in a vault at the Bureau, and is removed only at infrequent intervals for checking secondary standards.

The vault was recently equipped with a glass door so that visitors can be shown both the standard meter and kilogram without removing them. These two standards serve as the basis for all weights and measures in commerce, industry and science in the United States.

Besides the meter bar and kilogram, the National Bureau of Standards also has custody of about 700 other standards.

The standard kilogram's accuracy is basic to accurate determinations of the masses of nuclear particles, precise weighing of radioactive materials and determining the earth's mass.

Science News Letter, September 29, 1956



**NATION'S STANDARD**—Being removed from the special carrying case in which it was taken to Paris for comparison with the international standard is the U. S. national standard of length, a meter bar of platinum-iridium. Dr. Lewis V. Judson (left) personally carried the meter bar on its journey. Benjamin L. Page (right) is responsible for comparing the Bureau's working standards of length with the national standard. The meter bar was first placed in the cylindrical wooden container in front, this container was then placed in the black metal cylinder, which in turn was packed in the rectangular box.

# SCIENTIA INTERNATIONAL

## NOVAS DEL MENSE IN INTERLINGUA

► **Entomologia.**—Le studio del "voces de insectos"—i.e. de lor signales acustic—ha essite simplicite e rendite accessibile a amateurs gratias a un methodo disveloppate al Universitate Pennsylvania. Le signales es registrate super bandas magnetic. Iste bandas es ponite in contacto con pulvere de ferro carbonylic que adhere solmente ubi le bandas es magnetic. Le resultante configuration es transferite a un transparente banda adhesive de cellophan e montate pro investigationes ulterior super papiro o vitro o pelliculas de plastic.

► **Agronomia.**—Ha essite determinate que mesmo in le plus efficace installationes de irrigation, circa un tertio del aqua afferite se perde in reservorios o canales per infiltration in le terra ante que illo arriva in le area a irrigar. Pro reducer o eliminar iste guastation innecessari, le Station Experimental Utah del statunitense Departmento de Agricultura investiga le possibilitate de revestir le reservorios e canales de tenue pannos de plastic, per exemplo vinyl o polyethylene. Le resultados es apparentemente multo promittente.

► **Materiales.**—Ligno non perde su fortia per invetulation, providite, il va sin dicer, que illo es protegente contra le inclementias del tempore. Isto esseva determinate per tests in le "Edificio Octagon" a Washington que esseva erigite in 1798 con le uso de ligno de pino del sud del Status Unite. Le fortia del ligno in le Edificio Octagon esseva identic con le fortia de hodiern ligno del mesme provenientia.

► **Pisca.**—Esseva inventate un canna de pesca con un manica calefacibile. Le manica es cave e pote esser plenate de ardente carbon de ligno. Le temperatura es regulabile per reducer o augmentar le entrata de aere.

► **Ingenieria.**—Le crise de Suez ha suggerite le plano de construir un reimpalcamento ab le Mediterraneo via Israel usque al Golfo de Aqaba. Le distancia esseva 225 km in comparation con le 166 km del canal nunc in uso. Expertos de ingenieria signala que le projecto requirera circa duo annos de investigationes preparatori geologic e topographic. Le tempore requirite pro construir le nove canal es difficile a estimar.

► **Sexologia.**—Le "habitudines" sexual del animales unicellular que es cognoscite como paramosios cade in duo clarmente distingue categorias. Le unes se conjuga uniformemente con "consanguineos" multo affini, le alteres accepta solmente complete "estranjeros" como partenarios de conjugation. Iste differentia fundamental corresponde a multe altere distinctiones. Le "heteroconjugatores", per exemplo, ha un plus longe periodo de maturation que le "homocongugatores." Il es evidente que le prolongate maturation permette plus extense migrationes ante le occurrentia del conjugation.

► **Entomologia.**—On sape que le resistentia de muscas e mosquitos contra DDT consiste in le noveamente acquirite capacitate de producer un enzima que rende DDT innocue. Un nove descoberta in iste campo, facite per Dr. A. W. A. Brown de Canada e A. S. Perry de Georgia, signala que le enzima producite contra DDT per mosquitos e muscas domestic es identic. Nonobstante, le chimismo per que illo es producite pare esser multo differente.

► **Physica Atomic.**—Le descontamination de aquas continente radioactive reiectas industrial o accidental pote esser effectuate per le cultura, in tal aquas, del duo creaturas marin, *Aphanocapsa koordersii* e *Brachionus plicatilis*.

Illos concentra le radioactivitate in lor corpores, e *Brachionus* accelera le processo per devorar *Aphanocapsa*. Iste remarcabile phenomeno esseva observate per un gruppo de scientistas del Universitate Prefectural Mie in Japon. In lor reporto illos nota que post le experimentos atomic de Bikini, le studio del aqua contaminate revelava le presentia de creaturas marin continente concentrations de radioactivitate 1000 vices plus alte que lor ambiente.

► **Telephonia.**—Le Compania Telephonic Bell ha in uso un connexion experimental inter New York e Los Angeles que permette al telephonantes vider le un le altere. Le parte visual del connexion pote esser disrumpite o prevenite per le un o le altere del telephonantes sin disrumpir le connexion acustic. Le transmission visual functiona secundo le principios del television, sed durante que le mechanismo standard del television produce circa 30 complete imagines per secunda, le nove systema Bell se restringe a un imagine in duo secundas. In su forma presente le systema es troppo complexe e costose pro usos general.

► **Television.**—Un inventor de New York ha recipite un patente pro un receptor de television que functiona sin tubo de radios cathodic. Le tubos usate permette un construction con un si reduce tertie dimension que le apparato pote esser installate in un quadro pendente al muro como non importa qual pictura o photographia.

► **Astronomia.**—Il deveni de plus in plus probable que le planeta Pluto, descoberte in 1930, non es un ver planeta sed un escappate luna de Neptuno. Iste concepto esseva primo formulate per Dr. G. P. Kuiper del Universitate Chicago e es nunc supportate per Dr. E. K. Rabe del Universitate Cincinnati qui ha investigate le question mathematicamente super le base del theoria que le escappamento de lunas debeva occurrer quando le originalmente basse temperatura del sol comenciava montar, con le resultante evaporation del plus grande parte del massa que le planetas habeva possedite in lor stato initial.

► **Astronomia.**—Al recente congresso del Societate Astronomic American, tres typos de radio-signales recipite ab le planeta Venus esseva reportate. Duo de iste classes es transmittite a un longitude de unda de 11 m e se distingue principalmente per lor duration. Le longitude del tertie classe es 3.15 cm. Iste undas es de origine thermic e varia in fortia con le quantitate de lumine solar reflectite per Venus. Illos permette le conclusion tentative que Venus ha temperaturas normal de plus que 120 C.

► **Medicina.**—Studios del effectos anti-leucemic de irradiation de sanguine in derivation—i.e. de sanguine foras del corpore—ha ducite un gruppo de medicos francese al descoberta accidental sed epochal que individuos con sanguine irradiate durante su separation ab le corpore possede un elevate resistentia contra subsecuente irradiationes del corpore integre. Il pare tractar se de un specie de immunisation contra le effectos nocive de irradiation. Usque nunc iste observationes es restringite a animales.

► **Anthropometria.**—In un studio facite in 1895 a Praga, 76% del adultos mascule de 20 annos habeva staturas de minus que 170 cm. In un studio comparabile executate in 1955, quasi le mesme percentage—74.8%—habeva staturas de plus que 170 cm. Simile observationes ha essite facite in varie altere pais.

Science News Letter, September 29, 1956

## GENERAL SCIENCE

### Reading Interlingua

► YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, SCIENCE SERVICE's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

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## BIOCHEMISTRY

**Fight Shock Death by Shock Conditioning**

► AN ELECTRIC SHOCK a day for several days can prove life-saving, conditioning the body to resist otherwise fatal injury, at least in the case of laboratory rats.

After this conditioning, only 25% of the rats succumbed to injury that ordinarily can kill as many as 75%, Dr. Robert L. Griswold, Walter Reed Army Medical Center, Washington, reported at the American Chemical Society meeting in Atlantic City.

The electric shock given the rats is similar to that given to treat some mentally sick patients.

The rat experiments have not yet reached the stage of testing in human beings. However, Dr. Griswold hopes to learn from these studies a method that might condition humans to withstand better the shock of serious injuries in war or peacetime accidents.

Besides the electric shocks, a series of small, non-fatal injuries also proved capable of helping the rats resist ordinarily fatal injuries.

The conditioning apparently tones down the activity of the sympathetic nervous system so that it does not react too violently. This nervous system, which is without conscious control, responds to injury or the threat of danger by changing heart function, blood pressure, blood flow to various organs, and the output from the adrenal glands of the hormones, adrenaline and noradrenaline.

These changes get the body ready for "flight or fight." A prolonged high level of activity of this sort, however, similar to that in shock, can be harmful and hasten death instead of preventing it.

Dr. Griswold's studies are aimed at finding a method of keeping sympathetic nervous system activity from going that far in cases of shock.

Science News Letter, September 29, 1956

## PHYSICS

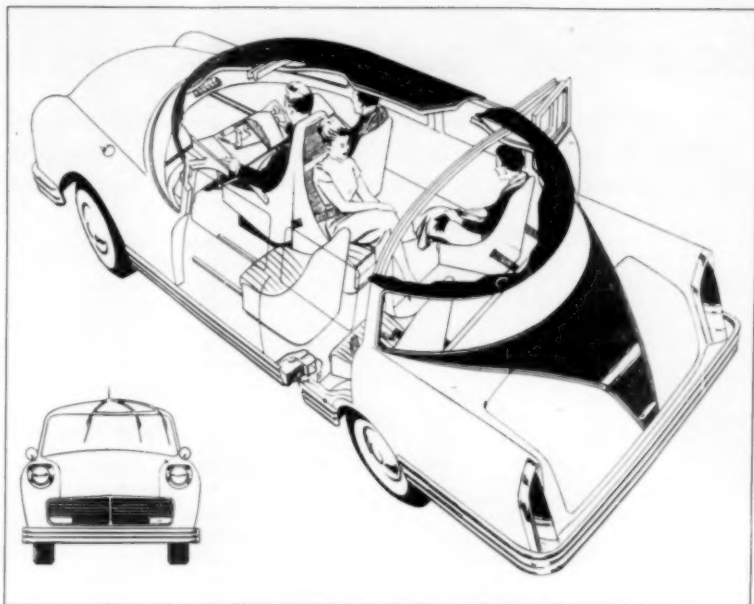
**Soap Bubble "Atoms" Show Matter's Structure****See Front Cover**

► SOAP BUBBLES are being used to illustrate how atoms group themselves into orderly arrangements, or crystal structures, at the Westinghouse Research Laboratories, Pittsburgh.

Because soap bubbles have a tendency to join and balance in much the same way as atoms do, this technique simulates actual atomic crystal structures of metals.

In the photograph on the cover of this week's SCIENCE NEWS LETTER, Dr. William Mullins is showing how research scientists can thus "see" and investigate on a vastly larger scale the patterns and defects of atoms. If the soap bubbles were atoms in an actual crystal, the space would be a six-millionth that between the bubbles.

Science News Letter, September 29, 1956



**PACKAGED PASSENGER**—Prototype of the safety automobile shows how the passenger can be given maximum protection against collision injuries. Safety principles incorporated in the design are the result of a joint study undertaken by the Cornell Aeronautical Laboratory and the Liberty Mutual Insurance Company. The cutaway drawing shows its main features, including recessed headlights and a cockpit-type windshield.

## ENGINEERING

**"Crash-Proof" Automobile**

► A "CRASH-PROOF" CAR is being built whose safety innovations could cut the death rate on the nation's highways in half. Passengers in the rolling safety package could emerge uninjured from a head-on collision at 50 miles per hour.

Details of the prototype safety car were made known by F. J. Crandall, vice-president of the Liberty Mutual Insurance Company, and E. R. Dye, head of the safety design research department of the Cornell Aeronautical Laboratory, joint participants in the report.

Externally, the "crash-proof" car looks just like any four-door sedan. Inside, however, the safety car has been radically changed.

Although the prototype car being built is not for mass production, it is expected to aid designers in producing safer automobiles.

This is what the car looks like on the inside:

1. The steering wheel has been eliminated and replaced by a hydraulic, two-handed lever-type control system set parallel to the floor.

2. The steering device is covered with a chest cushion and beneath the chest pro-

jector is a body-restraining U-shaped webbing yoke.

3. Passengers and driver sit in bucket seats. The passenger seats are to the rear of the driver and lower. The seat directly behind the driver faces to the rear, giving a club-car-like appearance.

4. The passengers, like the driver, are protected by similar webbing yokes and chest pads.

5. Each door has two sections hinged at the center and, to the rear body post. Doors are on rollers and move rearward, folding outward, like a single accordion pleat.

6. Metal stiffeners are built into the roof and are similar to "roll bars" on stock cars.

7. The wrap-around windshield provides undistorted visibility.

8. Other safety features include wrap-around front and rear bumpers that are spring-mounted; shock absorber material between the bumpers and body frame; air scoop on the roof to minimize exhaust gases coming into the car from other vehicles; color coded instrument panels; roof padding throughout, and safety seat belts.

The car is the result of four years of research.

Science News Letter, September 29, 1956

## GENERAL SCIENCE

# Science Youth Month

October is set aside as period during which the importance of encouraging scientifically inclined boys and girls will be stressed and science activities for school emphasized.

► AMERICA today is mobilizing its scientifically inclined boys and girls to celebrate October as National Science Youth Month.

Some 16,000 high school science clubs, with a membership of more than a third of a million, are spearheading a campaign to emphasize science activities for the new school year.

Watson Davis, director of SCIENCE SERVICE, which administers Science Clubs of America, emphasized that the solution of the serious scientific manpower shortage lies in the enthusiasm, training and encouragement of American youth today. Pointing out that scores of youth, civic, educational and industrial organizations are being invited to join National Science Youth Month, Mr. Davis said:

"October has been set aside to impress on the nation the importance of encouraging students in public, private and parochial schools to participate in local and regional fairs.

"At these fairs, the students exhibit the results of their work which often goes far beyond the school curriculum. Creative imagination, knowledge and technical skills, which often belie the students' age, are depicted in these exhibits. The two best exhibits at each affiliated regional fair are shown at the National Science Fair."

The Eighth National Science Fair will be held May 9-11 next year in Los Angeles, where it is forecast there will be 300 finalists representing 160 regional fairs from 40 states or more.

Another major activity emphasized in National Science Youth Month is the 16th Annual Science Talent Search for the Westinghouse Science Scholarships (see p. 207). Although the examinations for these 40 trips to Washington and scholarships, ranging in value from \$2,800 to \$100, will not be available until Nov. 15, many students are already preparing for them and are hard at work on the report of "My Scientific Project" that must accompany each entry.

Suggestions to teachers and others interested in increasing activity in science during National Science Youth Month are:

1. Those science clubs not affiliated with Science Clubs of America are urged to do so in order to get free "know-how," free handbook and other materials valuable to members and sponsors.

2. Start plans at once for a science fair. If you have not had one before, SCIENCE SERVICE will help you start one.

3. Ask for Science Talent Search examinations for the seniors who want to go into scientific research.

4. Invite local scientists and engineers to

one or more meetings of science clubs. Get the professionals and youth working together.

5. Ask professional and technical societies to devote at least one meeting this school year to "Science for Youth."

Science News Letter, September 29, 1956

## AERONAUTICS

## Hypersonic Wind Tunnel Is Model for Larger One

► THE AIR FORCE has disclosed details about its newest type of wind tunnel, capable of surpassing temperatures of the sun's surface and speeds of 11,000 miles per hour.

Nicknamed "Tunnel Hotshot," the test device is already in operation, helping to solve the problems man faces in traveling through outer space. The wind tunnel is used to test scaled models of long-range missiles and aircraft of the future.

Within the 16-inch-diameter test section of the hypersonic tunnel, speeds of 11,000 miles per hour, temperatures of 15,000 degrees and pressures of 20,000 pounds per square inch have been used. It is expected that even higher speeds and temperatures will be obtained.

Test runs in the new tunnel, in operation at the Air Research and Development Command's Arnold Engineering Development Center, Tullahoma, Tenn., last only about one-hundredth of a second. Runs of any longer duration would melt parts of the tunnel itself.

Despite the fact that the flow lasts for this very short period of time, the ARDC scientists pointed out, it is of sufficient duration to melt away portions of the nose of some of the models tested.

"Hotshot" is being used to explore possible methods for cooling the surface of missiles or aircraft as they get up to speeds encountering the "heat barrier."

In simplest terms, ARDC scientists said, "the operation of 'Hotshot' may be described as the process of creating a very powerful electrical explosion and then controlling, stabilizing and measuring the effects of its temperatures and forces as it passes over a scale model test object."

One of the "fastest" and "hottest" of the approximately 300 wind tunnels now in operation in the United States, "Hotshot" is only a model of a larger wind tunnel.

Science News Letter, September 29, 1956



**OXIDATION RATES**—At the University of California's new laboratory for sea food research at Berkeley, the present emphasis of the research is to find the causes and possible cures for fish deterioration through oxidation. Shown here are Eystein Einset (left), chemist of the U. S. Fish and Wildlife Service, and Dr. Harold S. Olcott (right), head of the Marine Food Technology laboratory, with equipment that shakes Yaks of fish oil while keeping the temperature right for oxidation experiments.



**WELDED GRAPHITE**—The line between the shiny and dull regions in this piece of graphite, barely visible in the photograph, is the place where two pieces were "welded" together at National Carbon Company's new research laboratories.

## PHYSICS

## Graphite Welded For First Time

► GRAPHITE PIECES have been "welded" together for the first time in history and the largest single crystals of cadmium sulfide so far known have been "grown," Dr. Robert G. Breckenridge, reported.

Dr. Breckenridge is director of the National Carbon Company's new laboratories at Parma, Ohio. National Carbon is a division of Union Carbide and Carbon Corporation.

Welded graphite allows scientists to pre-fabricate sheets and panels for the assembly of nuclear reactor moderators that now must be built from graphite blocks.

Cadmium sulfide, used in solar batteries, photo cells, and as a light-producing phosphorescent material when properly activated, has been made in single crystals measuring three-eighths of an inch in diameter and several inches long.

These single crystals, Dr. Breckenridge said, have proved superior to those of a polycrystalline film.

Key to the success of how to melt graphite together was the discovery that, when heated to a high temperature, high pressure can prevent vaporization.

This technique, Dr. Breckenridge said, has already led to the production of new forms of graphite that have a much higher degree of crystalline perfection than any artificial graphite attainable up to now.

Science News Letter, September 29, 1956

Seven or eight million Americans have hay fever.

## PHYSICS

## Expect New Anti-Particles

► DISCOVERY of the anti-neutron by scientists at the University of California does not exhaust the possible anti-particles physicists expect will be found.

In the strange world of atomic nuclei, there are still a large number of short-lived anti-fragments that will leave their tell-tale tracks in the supersaturated water vapor of a cloud chamber or be caught on photographic emulsions.

Both cosmic rays and the high energy atom smashing machines could yield these new anti-particles.

Most likely accelerator to produce one or more of the yet undiscovered anti-particles is the new ten billion electron volt (Bev) machine scheduled to start operation within six months in Russia. It has the necessary power to turn pure energy into matter, as was done in the six Bev bevatron at Berkeley to make both the anti-proton and the anti-neutron. (See SNL, Sept. 22, p. 183.)

Although pi mesons, the glue that keeps atomic cores from flying apart, have anti-particles physicists have known about, anti-particles for the very rare hyperons have not yet been found.

Hyperons are unstable particles having masses heavier than the neutron and proton. They live for only billionths of a second, but during that fleeting lifetime, their existence is just as real as that of the neutron, which lasts for about 15 minutes before decaying into a proton.

One puzzling question, therefore, is exactly what are fundamental particles. Neutrons and protons are, physicists agree, but they are still debating where to draw the line, since the number of strange fragments found in the debris of smash-ups between atoms keeps increasing.

The anti-particles of hyperons expected some day to be discovered include one for Lambda zero; one for each of the three kinds of Sigmas now known, and one for negative Xi.

Scientists are also searching for the anti-neutrino. The neutrino, first suggested by Dr. Wolfgang Pauli and the late Dr. Enrico Fermi in 1934, was only recently detected directly, although its existence had long been thought real on the basis of indirect evidence. (See SNL, June 30, p. 410.)

Science News Letter, September 29, 1956

## PUBLIC HEALTH

## Audible Nerve Gas Alarm

► THE ALARM for a nerve gas attack can now be given audibly and visibly by automatic devices that detect the deadly colorless, odorless gas in quantities "too small to affect human or animal life."

The devices, including a portable one for Army field use that can be dropped by parachute, were announced at the American Chemical Society meeting in Atlantic City.

Besides their value for protecting troops and civilians in case of war, the devices can be adapted for use in nerve gas arsenals and plants, in laboratories, to detect the new insecticides related to nerve gas, and to detect other dangerous gases such as "silo gas" that sometimes kills farmers.

For combat is the portable B21 developed jointly by the U. S. Army Chemical Corps and Radio Corporation of America. It is waterproof, about the size of a portable typewriter, weighs about 25 pounds, is highly sensitive yet tough enough to withstand parachute drops, John C. Young, physical chemist at the Army Chemical Center, Edgewood, Md., reported.

This device filters a sample of air to remove dust, then passes the air through a paper tape wetted with a solution of ortho dianisidine and sodium pyrophosphate peroxide, which turns red if nerve gas is present. Photocells react to the red color on the paper tape by triggering an audible and visible alarm.

The B21 will operate continuously for 12

hours on 24-volt direct current electricity. After 12 hours, it can be serviced and put into operation again in a matter of minutes.

The B21 is relatively cheap in cost and has been designed for mass production if required. By using different chemical reagents, it can be adapted to detect other gases and is believed to have broad applications to industrial air pollution.

A different chemical-electronic system, using "black light," works the gas alarm device reported by Harold R. Smith of the Chemical Warfare Laboratories and a team of chemists of Leeds and Northrup Company, Philadelphia.

This instrument, which is not portable, uses chemicals that fluoresce under "black light" to detect as little as one part of nerve gas in 10,000,000 parts of air. It is being used at the Army's Rocky Mountain Arsenal among other places.

Neither visible light nor fluorescent light is needed for the nerve gas alarm reported by Jerome Goldenson of the Chemical Warfare Laboratories.

This device operates on a chemiluminescence principle.

"The most promising potential use for the new chemiluminescence method (which produces light by reaction of the nerve gas with the chemical, luminol) is for continuous automatic sampling of the atmosphere," Mr. Goldenson said.

Science News Letter, September 29, 1956

## GENERAL SCIENCE

**Special Heart Award to President's Consultant**

► A DOCTOR, Dr. Paul Dudley White of Boston, heart consultant to President Eisenhower, is getting an award for a newspaper reporting job.

The award recognizes the job he did in reporting on and explaining President Eisenhower's heart attack of September, 1955.

The American Heart Association, which each year gives Howard W. Blakeslee awards for outstanding reporting in the field of heart disease, will this year give a special Blakeslee award to Dr. White for "creating better understanding of heart disease."

The idea for such an award to Dr. White was suggested last October by Watson Davis, director of SCIENCE SERVICE.

Regular Blakeslee awards will go to Frank Carey, science reporter, Associated Press, Washington; Nate Haseltine, science writer, *Washington Post & Times Herald*; Robert P. Goldman, science editor and assistant managing editor, *Parade* magazine; Science Department, *Life* magazine; Howard Whitman, medical commentator on the NBC television network; George Voutsas, producer-director, and Earl Hamner, writer, for the radio program, "Courage to Live," broadcast by the NBC Radio Network.

Science News Letter, September 29, 1956

## PUBLIC HEALTH

**Detect Five Unsuspected Cancers in 1,000 Women**

► A MASS CANCER DETECTION program among women has picked up almost five unsuspected cancers of the uterus, or womb, for every 1,000 women examined.

The mass detection program was conducted in Memphis and Shelby County, Tenn., by the University of Tennessee and the U. S. National Cancer Institute. Preliminary findings from the first three and a half years of the survey are reported in the *Journal of the American Medical Association* (Sept. 15).

The aim is to examine all women over the age of 20 in the area and then to make three annual re-examinations. So far 108,000 women have been examined once, 33,000 twice and 8,000 three times.

On the second examination of 33,000 women, intraepithelial cancer was found at a rate of 2.2 per 1,000 women, compared to 3.6 per 1,000 on the first examination. Intraepithelial cancer is the kind thought to be a forerunner of invading cancer of the neck of the womb. It is usually symptomless.

The rate of detection of cancer of the uterus dropped from 3.4 per 1,000 to 0.3 per 1,000 on the second examination.

The lower rates in the second screening examinations suggest the mass screening approach can be useful since, with it, cancer is found in the early and still curable stages.

Final conclusions, however, cannot be drawn.

The Papanicolaou smear technique, in which cells are collected on a slide for microscopic examination, was used. Results show its value for early cancer detection.

Half of the uterine cancers and two-fifths of the intraepithelial cancers found were in Negroes who made up one-third of the population surveyed.

The peak incidence of intraepithelial cancer in women is from 30 to 34 years of age, with the peak for cancer of the womb from 50 to 54 years.

Scientists reporting the survey are Drs. Cyrus C. Erickson, Bennett E. Everett, Jr., Lloyd M. Graves, Raymond F. Kaiser, Richard A. Malmgren, Phil C. Schreier and Douglas H. Sprunt, and Irma Rube, M.S., and Sidney J. Cutler, M.A. They are from the University of Tennessee and the National Cancer Institute.

Science News Letter, September 29, 1956

## PHYSICS

**Convert Atomic Radiation Into Chemical Energy**

► STEPS toward the direct conversion of atomic radiation into chemical energy, one of the most important objectives in atomic energy development, were detailed to the American Chemical Society meeting in Atlantic City by Drs. R. H. Schuler and N. F. Barr, reporting work done at the Brookhaven National Laboratory.

Ionizing radiations were used to oxidize an iron salt, ferrous sulfate, in the research aimed at understanding the decomposition of water by radiation. This gives information on the direct effects of radiation on chemical change.

Most atomic energy is used by degrading the radiation energy into heat and then using the heat to produce chemical or other effects. Radiant energy such as in the sunshine is converted directly into chemical energy in the green leaf by the process called photosynthesis. An equivalent in atomic energy would be desirable.

Science News Letter, September 29, 1956

## PHYSIOLOGY

**Follow Cat's Example And Stretch Often**

► FOLLOW THE EXAMPLE of the family cat and stretch often, Dr. Harvey E. Billig Jr. of Los Angeles advised at the International College of Surgeons meeting in Chicago.

People tend to tighten up overnight because they do not move much, he pointed out. The cat, on the other hand, arises and stretches periodically, then resumes its nap.

Stretching often will help keep people more agile. Sedentary workers, he pointed out, tend for lack of stretching to contract into a sitting position so that when they try to stand erect they end up with a "hollow back."

Science News Letter, September 29, 1956

## CHEMISTRY

**Chemists Learn Secrets Of Nature's Processes**

► POWERFUL UTILIZATION by the chemist of catalytic forces that nature uses so abundantly in manufacturing natural products and controlling life processes was predicted for the future by Sir Hugh Taylor, Princeton University professor of chemistry, in his presidential address at the first International Congress on Catalysis in Philadelphia.

Explaining the great progress in developing and understanding catalytic agents for speeding chemical reactions, even at very low temperatures, Sir Hugh told how changes in hydrocarbon materials by catalysis indicate that, in the surface material speeding the changes, there are strongly polarizing if not ionic centers.

The modification of surface catalytic agents can produce, by polymerization of monomeric materials such as isoprene, he explained, in one case the stereo-specific configuration in natural rubber and in another case that which nature produces in balata or hard rubber.

Science News Letter, September 29, 1956

## CHEMISTRY

**Chemicals Can Kill Weeds But Spare Crops**

► TWO GROUPS of chemicals that spare the crop and spoil the weed were described to the American Chemical Society meeting in Atlantic City.

Use of the chemicals will mean that the farmer can control grassy weeds in his fields of broad-leaf crops, such as peas, beans and radishes, as well as corn.

The prediction that selective chemical weed control will be possible in the "near future" was made by Dr. P. C. Hamm, project leader in charge of the herbicide screening program at the Monsanto Chemical Company, St. Louis, Mo.

The two groups of chemicals are N-substituted thioesters of dithiocarbamic acid and N-substituted alpha-chloroacetimides.

Modifications of these two chemical groups were used effectively to control germinating grass seeds of wild oats, rye grass and brome grass. Results of the weed-killing tests show, Dr. Hamm said, it will soon be possible to "tailor-make" a variety of weed-killers that will attack only the weed and save the crop.

Even more immediate, Dr. Hamm said, is the use of these same chemicals as tools for biochemists studying cellular chemistry. They could furnish practical means of controlling annual grasses in a variety of crops.

Science News Letter, September 29, 1956



## PSYCHOLOGY

**Lack of Love Can Affect TB**

► UNHAPPINESS in the home and deprivation of love might be a contributory factor in the onset of tuberculosis.

This is strongly suggested by answers given to a questionnaire, according to Dr. D. M. Kissen of the Department of Health for Scotland, Edinburgh. The questionnaire was answered by a group of people attending a diagnostic chest clinic.

Questions asked included:

Did you have a happy childhood, and has there been any divorce or marital separation in your immediate family?

Have you had any unhappy love affairs, and have you any frustrated desires, hopes or ambitions?

Patients questioned included people suffering from different conditions or with no abnormality.

Of 267 patients investigated, 88 were subsequently diagnosed as cases of pulmonary TB. The main finding from the questionnaire was that emotional factors preceded the onset of pulmonary TB.

More than 90% of the emotional factors could be grouped under "break or serious threat of a break in love link"—romance, engagement or marriage.

The term "love" was used in its spiritual sense.

"Sexual factors were conspicuous by their absence," says Dr. Kissen.

Other broken love links were caused by bereavement, "break within the family for various reasons and enforced separation due to circumstances."

Science News Letter, September 29, 1956

## BIOCHEMISTRY

**Discover Clue Concerning White Blood Cell Function**

► USING a radioactive chemical to study white blood cells in leukemia patients has given a clue to the immunity function of the white blood cells called lymphocytes.

The studies were made by Dr. L. D. Hamilton of Sloan-Kettering Institute for Cancer Research, New York.

Lymphocytes in leukemia, he finds, live almost four times as long as another kind of white blood cell, the granulocytes. The leukemic granulocytes have an average lifespan of 23 days, compared to 85 days average survival for the leukemic lymphocytes.

Either some lymphocytes survive for very long periods or, Dr. Hamilton suggests, the lymphocytes reuse large fragments of nucleic acid or nucleoproteins or chemical forerunners of these.

The latter explanation, he thinks, is the

more likely one, and the one that suggests something about how lymphocytes function in immunity to disease.

Lymphocytes are believed to produce antibodies, the substances in the body that fight specific disease germs. Although antibodies cannot reproduce themselves, they continue to be formed long after apparently limited contact between the body tissues and the antigen of a disease germ.

This happens, Dr. Hamilton thinks, because when lymphocytes are destroyed their nucleic acids are reused, thus letting the body preserve the necessary templates for production of specific antibodies.

Dr. Hamilton's studies were made by injecting radioactive adenine into two patients with chronic lymphatic and two with chronic granulocytic leukemia, then following the way in which the radioactive adenine was incorporated into the nucleic acids of the lymphocytes and granulocytes. He reports his findings in *Nature* (Sept. 15).

Science News Letter, September 29, 1956

## NUTRITION

**Prosperity Causing Americans to Be Obese**

► PEACE AND PROSPERITY are making Americans fat.

Obesity, brought on by fattened wallets, is the biggest nutritional problem in the United States, Dr. Charlotte M. Young of Cornell University told the Second International Congress of Dietetics in Rome.

Basing her conclusions on Cornell's diet experiments, Dr. Young said that too much prosperity is making for too much overweight because her countrymen are becoming "unwittingly lazier and lazier physically." Nutritional aspects of the problem, she told the Congress, are secondary to its economic, social, cultural and emotional roots.

The only cause for obesity, she explained, is an energy intake greater than an energy output.

Sitting and watching sports, easy housework and travel, and short work weeks, Dr. Young pointed out, all reduce the energy output of the American people. Add these factors to heaps of food and money, clever advertising, poorly used leisure time, and the American tradition of uniting hospitality with eating, and overeating results.

Some people, she said, even try through eating to relieve the tensions and anxiety of living in a highly competitive society, or to express their hostility and defiance.

Dr. Young recommended four remedies to the American problem of too much prosperity on the dinner table:

1. Better mental health facilities to correct defects that lead to compulsive eating.

2. Education in using leisure time to reduce boredom, especially in middle-aged women.

3. Re-education of eating patterns, especially social refreshments.

4. More physical activity for all age groups.

Science News Letter, September 29, 1956

## GENERAL SCIENCE

**Report Shows Extent of Federal Aid to Students**

► EVERY SIXTH UNDERGRADUATE student in college in the United States received money for his education from the Government two years ago.

Together with graduate and postdoctoral students, a total of 390,000 young Americans received an average of \$1,000 each for instruction in all fields of study.

These figures, broken down to show Federal support for science students in higher education in this country, were compiled by the National Science Foundation to help planners evaluate proposals for Government-financed scholarship programs now being considered. Such programs might be one answer to solving the current scientific manpower shortage.

The report shows that the more advanced a student is in his scientific training, the greater his chances for receiving Government aid.

Although only 82,000, or one-fourth, of the undergraduates receiving aid were pursuing scientific studies, approximately one-half or 18,000 graduate students and virtually all, 1,300, postdoctoral students receiving aid were preparing for careers in science.

By far the greatest aid was given through the veterans' educational benefits. Practically all of the undergraduate students in all fields receiving Government money were veterans of the Korean conflict, studying under Public Law 550.

The report also shows that more than one out of every three students receiving Federal aid for graduate work was employed as a research assistant.

Science News Letter, September 29, 1956

## GENERAL SCIENCE

**State Dept. Assailed On Passport Procedures**

► PASSPORT PROCEDURES of the State Department are a "flagrant" violation of the constitutionally guaranteed right to travel, the passport committee of the Federation of American Scientists has charged.

Although more than a year has passed since the U. S. Court of Appeals ruled that U. S. citizens cannot be deprived of the right to travel without due process of law, the scientists' committee said, the State Department has not yet revised its passport procedures.

Denying a passport to Dr. Weldon Bruce Dayton, a cosmic ray physicist who has been working at Corning Glass Works, obstructs international scientific exchange and violates personal rights, the committee charged.

The Federation urged the Government to issue "without further delay" a passport allowing Dr. Dayton to accept a research post offered him by the Tata Institute in India.

Science News Letter, September 29, 1956

## ENGINEERING

# Living in a Blueprint

Architects for a new office building first constructed a full-size model of one office, so a committee could try out all ideas for interior and exterior design. Saves time and money.

By HOWARD SIMONS

► HOW WOULD YOU like to live in a typical room of your dream house and try out every interior and exterior design idea you wanted before and while the house was being built?

It could save money by avoiding mistakes and by satisfying changes of mind, and it could save arguments among the tenants.

This is what an insurance company in Hartford, Conn., tried for a new office building. They found it saves time, money and waste, as well as insuring the best possible materials and working conditions. It also gives architects and builders an opportunity to learn new techniques.

Although a single room prototype for the average American homebuilder is still far in the future because of cost, it may soon be the standard operating procedure for large construction jobs, as it now is in the aviation, automotive and shipbuilding industries.

Prototype test models have been the mainstay for many engineering projects for some time now. Use of a prototype for building, however, is new.

## Three-Dimensional Blueprint

This is not a small-scale model on a table in the architect's office, but a three-dimensional blueprint, where the people work and live while builders, engineers and architects rip out ceiling and floors and put in new ones so a committee can literally taste-test the new ideas.

When Connecticut General Life Insurance decided to build a country office five miles outside Hartford on a tract of 268 acres, its architects, Skidmore, Owings and Merrill, proposed a low horizontal glass wall building.

The plan called for several novel construction and design features, and both the company's executives and the architects agreed it might be wise to run a test program in advance of crucial construction stages.

This in itself was novel, and what has resulted is perhaps the world's most complete experimental structure.

The prototype measures 60 by 72 feet and represents about one percent of the total office space, 4,000 square feet compared to 500,000 square feet. The prototype constitutes a full scale replica of a typical clerical area in the main building, with the front of the mock-up simulating

the glass facade of the proposed building and the opposite glass wall representing the side overlooking a garden court. The main building will have four interior garden quadrangles.

The mock-up was constructed as a temporary building. Its steel frame consists of three heavy steel girders spanning three steel columns. The walls are plywood. The second floor, with a glass wall facade, characteristic of the exterior design theme for the whole building, is the experimental area. The ground floor serves as storage space for construction materials, fixtures and tools.

At one point, however, the builders used the storage space to test various types of concrete forms and glazed brick work that are being considered for use in the final structure.

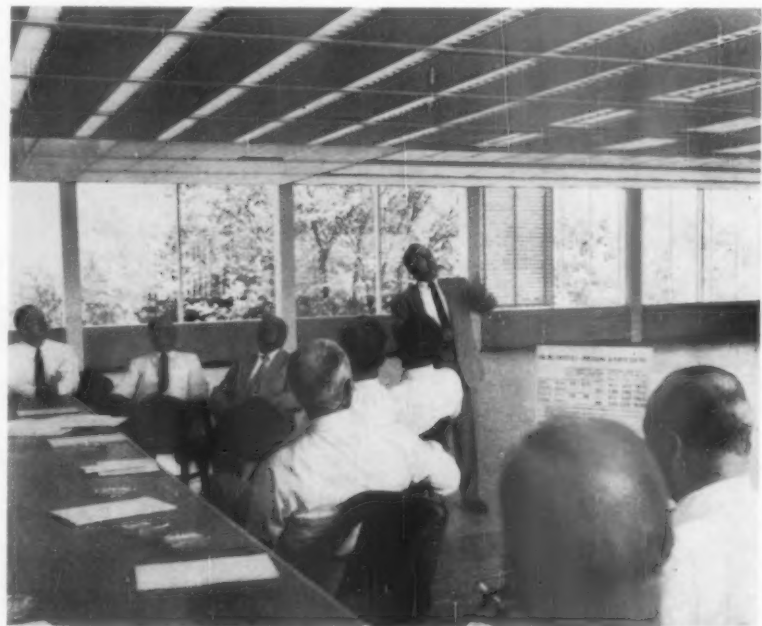
The mock-up has been tested since last spring. In it, the company and its architects

are able to examine, in full size, details of lighting, ceiling, partitioning and screening systems, and their relation to furniture, floor finish and color.

Before any decision on the interior and exterior design ideas were incorporated into the main and permanent structure, a committee passed on all experimental tests in the "mock-up." Two committees were used, a senior, seven-man committee of the company's top officers and a four-man subcommittee of junior officers. These groups worked with both the architects and the builders on every phase of construction.

A floor pattern, for example, would be checked to determine whether it was cheapest, best and fitted well with the rest of the office interior. If it was rejected, another floor pattern was tried by the testers.

For example, the two long walls of the sample building have different windows; one side has eight-by-11-foot panes and the other, six-by-eight-foot panes. The larger size was chosen for the finished building by the committee and will be of three-eighths-inch, heat-absorbent glass. They will be the largest panes of this type to be used in building construction to date.



**LIVING BLUEPRINT**—When Connecticut General Life Insurance Company decided to build a new office building near Hartford, Conn., the executives agreed a full-size model section of the main building should be built first. Here in the "mock-up" conference room, a test ceiling is being evaluated by a committee that passed on experimental interior and exterior design ideas before the main structure was built.

One of the most important tests with the mock-up was for lighting. Three basic ceilings with a dozen variations were installed in the model. As a result of the tests, the committee chose a new open baffle design developed by the architects. The bare fluorescent tubes and exposed steel beams, overhead subfloor, sprinkler pipes, air-conditioning ducts and electrical conduits were all tried out in the ceiling, rather than on paper.

### Money Saved by Experiments

Illustrating how the mock-up can be a money-saver in building today, one modification of the basic ceiling system—looked on paper to be the simplest and cheapest. When actually tried, however, the estimated saving of 50 cents a foot turned into a cost of ten cents a foot more. The total saving can be figured when one realizes that the completed building will have 350,000 square feet of ceiling.

The finished building is designed to accommodate 3,000 office workers, none of whom will be more than 35 feet from a window wall.

Experiments have been conducted with a newly designed, movable partitioning that can be placed almost anywhere. Aluminum, hollow-square posts will fit into the corner of floor squares and into recessed runners on the ceiling. Colored plastic lapinates will separate clerical areas. Fabric-surfaced panels will be used in areas where tack boards are required or where there is a sound problem. Office enclosures will be of translucent glass.

Cost of the mock-up and the experiments might appear big until they are related to the cost of the project. The cost of constructing and demolishing the model building, and the cost of all the experimental work carried out in the prototype is estimated to be one percent of the total cost for the entire project.

To the insurance company, one percent seems like a very small premium to insure against the possibility of expensive errors in building construction.

Science News Letter, September 29, 1956

### GENERAL SCIENCE

## Suggest Labor Source

► THE "EX-EMPLOYEE" may be a new and hitherto overlooked source of workers for hard-pressed business and industrial employers.

This was suggested in a study at the University of California at Los Angeles by Dr. Wayne L. McNaughton of the Graduate School of Business Administration.

The investigation was conducted with the cooperation of a large western aircraft company whose rate of employee turnover was 5,600 separations a year from a work force of 10,000. It covered all former workers who had been gone from two to 11 months.

For statistical reasons, Dr. McNaughton's analysis was limited to employees who had resigned during the second, seventh and eleventh months previous to the study.

Each of the ex-employees received a questionnaire with a covering letter assuring them their answers would have no effect on their record.

The ex-employees were asked:

1. Why did you quit your job with the company?
2. Would you like to return to the company?
3. What did you like best about the company?
4. What did you dislike most about the company?

One of the first things Dr. McNaughton noted was that the reasons given in the confidential questionnaire for leaving the company were quite different from those given at the time of separation.

Most of the ex-employees had told interviewers on their departure that they were leaving for "other employment." Other common reasons included "leaving the state," "returning to the farm," "military service," "poor health" and "maternity."

The general impression was that the employees were being forced out of the company by forces beyond the employer's control.

However, the questionnaires filled out by

employees after they had left the job revealed a very different picture.

On these the ex-employees emphasized such reasons as "poor pay," "bad supervision," "slow advancement." About 40% of the workers gave a "polite" excuse at the time of leaving, then gave a more truthful answer later.

Most disliked by the ex-employees was the poor quality of supervision, 23% of the two-month group so stating. Wages as a disliked factor was reported by eight percent, five percent and ten percent of the three groups.

Another five percent, eight percent and three percent had been dissatisfied with the nature of the job.

The remarkable finding of the survey was the number of ex-employees who said they would consider rejoining the company. Three out of four ex-employees who had quit after two months on the job indicated they were still interested in rejoining the company, as were 57% of the group which had quit after 11 months.

Science News Letter, September 29, 1956

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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**ANTARCTICA IN THE INTERNATIONAL GEOGRAPHICAL YEAR:** Based on a Symposium on the Antarctic—Laurence M. Gould and others—*American Geophysical Union*, 133 p., illus., \$6.00. It is a matter of wonder to scientists that so large a portion of the earth as the unknown areas of Antarctica remains unexplored. This area will receive particular attention during the coming International Geographical Year.

**AQUATIC INSECTS OF CALIFORNIA:** With Keys to North American Genera and California Species—Robert L. Usinger, Ed.—*University of California Press*, 508 p., illus., \$10.00. An aid in identification.

**CLINICAL CHEMISTRY: Principles and Procedures**—Joseph S. Annino—*Little, Brown*, 280 p., illus., \$7.50. Intended to fill the gap between the "cookbooks" that present only the mechanics of methods and the theoretical textbooks.

**THE DRUNKEN FOREST**—Gerald Durrell—*Viking*, 238 p., illus. with drawings by Ralph Thompson, \$3.75. The story of a six-month trip by a naturalist and his wife to South America. The book takes its name from a tree that has a swollen "tummy" and leans somewhat. South Americans call it the "drunken stick."

**THE EARTH BENEATH US**—H. H. Swinerton—*Little, Brown*, 335 p., illus., \$5.00. De-

scribing the age, origin and structure of the earth, and also the evolution of plants and animals.

**HUMAN GENERATION: Conclusions of Burdach Döllinger, and von Baer**—Arthur William Meyer—*Stanford University Press*, 143 p., illus., \$3.50. A classic by scientists writing before the birth of modern embryology.

**INDUSTRIAL VISION**—H. W. Hofstetter—*Chilton*, 189 p., illus., \$10.00. A text for undergraduate optometry students, and a reference work for ophthalmologists and those concerned with the problem of protecting vision on the job.

**INFORMATION THEORY: Papers Read at a Symposium Held at the Royal Institution, London, Sept. 12-16, 1955**—Colin Cherry, Ed.—*Academic*, 401 p., illus., \$11.50. On a relatively new field of importance to many disciplines.

**JOURNEY TO THE CENTER OF THE EARTH**—Jules Verne, translated by Willis T. Bradley—*Wyn*, 256 p., \$2.95. A new translation of a science fiction "granddaddy."

**THE LITERATURE OF PESTICIDE TOXICOLOGY**—Henry F. Smyth, Jr.—*Mellon Institute*, 3 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Information for those who handle the pesticides and for health officials and physicians.

**THE MAGIC OF SOUND**—written and illustrated by Larry Kettelkamp—*Morrow*, 64 p., \$2.00. Experiments that children can perform to learn about sound.

**MINERAL DRESSING STUDIES ON THE GREAT GOSSAN LEAD ORE FROM CARROLL COUNTY, VIRGINIA**—M. P. Corrivane—*Virginia Polytechnic Institute, Bulletin, Engineering Experiment Station Series No. 113*, 79 p., illus., paper, 50 cents. In order to get the most complete utilization of the minerals, a combined treatment using flotation, roasting and leaching is recommended.

**A NEW APPROACH TO SCHIZOPHRENIA**—Julius I. Steinfeld—*Merlin*, 195 p., \$4.95. Presenting the author's theories as to the origin of this common mental illness and suggesting measures for avoiding or mitigating it. Dr. Steinfeld before his death had read proof on the entire manuscript.

**PENGUINS**—Louis Darling—*Morrow*, 64 p., illus. with drawings by author, \$2.00. Penguins, the author tells us, are not funny at all to other penguins. Their odd habits help them adapt to difficult living conditions.

**THE QUMRAN COMMUNITY: Its History and Scrolls**—Charles T. Fritch—*Macmillan*, 147 p., \$3.25. A Presbyterian clergyman here tells the fascinating story of the Dead Sea scrolls and the ancient community in which they were found, as well as their significance for Biblical studies.

**READING IMPROVEMENT FOR ADULTS**—Paul D. Leedy—*McGraw-Hill*, 456 p., illus., \$5.95. A do-it-yourself book for helping you to read faster and with more comprehension.

**ROBERT HOOKE**—Margaret 'Espinas—*University of California Press*, 192 p., illus., \$3.75. A biography of a distinguished scientist who served the Royal Society from 1662 until his death in 1703. The book was inspired by a study of Hooke's diary.

**ROSENAU PREVENTIVE MEDICINE AND PUBLIC HEALTH**—Kenneth F. Maxcy, Ed.—*Appleton-Century-Crofts*, 8th ed., 1465 p., illus., \$15.00.

New edition of a classic known previously as "Preventive Medicine and Hygiene."

**SAHARA ADVENTURE**—Philippe Diolé—*Messner*, 185 p., illus., \$4.50. By the director of undersea archaeological research for the French National Museum. On this trip, M. Diolé has exchanged his aqualung for a camel, but his archaeological finds were equally interesting. Translated by Katherine Woods.

**SALT-WATER AQUARIUM FISH**—Herbert R. Axelrod and William Vorderwinkler—*Sterling*, 160 p., illus., \$3.95. A how-to-do-it book for the fish enthusiast.

**STEP LIVELY . . . AND LOSE WEIGHT**—*American Dietetic Association*, 5 p., illus., paper, 3 cents if ordered direct from publisher, 620 North Michigan Ave., Chicago 11, Ill. Suggestions for losing weight.

**THE TRUTH ABOUT EYE EXERCISES**—Philip Pollack—*Chilton*, 117 p., illus., \$4.75. Intended to debunk the idea that if you exercise your eyes, you can throw away your glasses.

**THE WORLD'S TANKERS**—Laurence Dunn—*Adlard Coles [John de Graff]*, 176 p., illus., \$6.95. The petroleum industry and the ships that serve it have developed in less than a century since the first oil well was drilled in 1859.

Science News Letter, September 29, 1956

## AERONAUTICS

### Hypersonic Research Rocket Developed

► A RESEARCH ROCKET that reaches several times the speed of sound in just two seconds has been developed by the Air Research and Development Command.

Called the Hypersonic Test Vehicle or HTV, it was developed as a free flight research tool to gather data at hypersonic speeds by Curtiss-Wright's Aerophysics Development Corporation, Santa Monica, Calif.

Twenty experimental models have been fired and tested at ARDC's Holloman Air Development Center, Alamogordo, N. Mex.

The HTV is a two-stage solid propellant rocket vehicle, the first stage being a seven-rocket booster that raises the second stage of four rockets to a supersonic velocity.

Science News Letter, September 29, 1956

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## MEDICINE

# Chart Output of Heart

► DOCTORS may soon be able to measure the power output of the human heart and its reserve power in both a healthy person and a heart disease patient.

A method for doing this in animals, soon to be applied to humans, has been discovered by Dr. Donald L. Fry, Alexander J. Mallos and Alfred G. Casper of the National Heart Institute, Bethesda, Md.

By the new method, scientists can measure the velocity with which blood is ejected at a given instant from the heart into the aorta. The aorta is the great artery that arches from the top of the heart to supply blood to the entire body.

The output of the heart can be calculated by multiplying the blood velocity by the cross sectional area of the part of the aorta in which the velocity measurements are taken. From this output power, the heart's reserve power can be judged.

The physical abilities and limitations of a given heart patient and the risk to him of a stressful experience such as an operation can then be determined more precisely.

To measure the blood velocity in the aorta, the heart institute scientists thread a slender flexible plastic tube known as a catheter through a small cut in a leg artery. The catheter is double, consisting of two hollow tubes fused side by side. Openings in the side of the catheter are placed so that one of the tubes measures blood pressure about two inches downstream from the other.

The difference in pressure between these two openings is converted by a special "differential pressure gauge" to variations in electrical current that move the arm of a pen and ink recorder to produce a permanent record of the pressure difference.

The scientists have deduced a mathematical formula for calculating the instantaneous aortic blood velocity from this pressure difference. They have verified the method experimentally in dogs and in models designed to simulate the pulsating flow of blood from the heart.

Although these tests show the method to be reasonably accurate and safe in dogs,

the scientists believe that further refinements are necessary before its application to human beings.

They are now concerned with developing an electric computer to perform the time consuming computations, so that the velocity will be recorded on a strip chart instantaneously. They are also trying to design a more accurate system for sensing the aortic pressures from which blood velocity is computed.

Science News Letter, September 29, 1956

## CHEMISTRY

## Decontaminate Water Poisoned by Atom Bomb

► WATER not too severely contaminated by atomic bomb explosion or atomic waste accidents can be decontaminated and made safe for emergency drinking use in 15 to 30 minutes, the American Chemical Society meeting in Atlantic City was told by William J. Lacy of the U. S. Corps of Engineers.

Ion exchange resins would be used in a process similar to that of many home water softeners. Radioactive ions in the contaminated water would be deposited upon the resin so that the water drawn off is safe for use.

The method would be effective, small scale experiments at Oak Ridge National Laboratory showed, if the contamination were not more than ten times the maximum safe amount. Mr. Lacy and Don C. Lindsten, who did the tests, estimate that fallout from a 20,000-ton atomic bomb could be handled by the ion exchange method.

Home water softeners that use ion exchange resins would greatly reduce atomic contamination in routine operation. A person could readily purify enough water for his family's use if a supply of the resin was available.

Small or medium sized municipal water supplies could be made potable by the ion-exchange method if not too heavily contaminated.

Science News Letter, September 29, 1956

## METEOROLOGY

## H-Bomb Fallout Found World-Wide

► RADIOACTIVE DEBRIS from two early hydrogen bomb explosions in the Pacific fell out not only in the Northern but in the Southern Hemisphere, three U. S. Weather Bureau meteorologists report.

They charted the paths taken by radioactive particles thrown into the air when Pacific coral islands were vaporized by United States H-bombs, Mike on Nov. 1, 1952, and Bravo on March 1, 1954. The fallout was measured by collecting it on gummed paper at stations around the world.

The weathermen's planetary fallout maps are totals for the first 35 days following the explosions. No attempt was made, Drs. L. Machta, R. J. List and L. F. Hubert report in *Science* (Sept. 14), to reconstruct fallout patterns within the first 24 hours.

They conclude that hydrogen bomb explosions from which large amounts of radioactive debris are spewed high in the atmosphere provide weathermen with "useful information" on world-wide circulation, even though present measuring methods are crude.

One difficulty, they point out, is that collecting hydrogen bomb debris on gummed paper is efficient only when, at the time the radioactive cloud is over a particular station, it either rains or the air is particularly turbulent.

Science News Letter, September 29, 1956

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## Do You Know?

The average American family uses 888 cans of food in a year.

A quarter of a million tons of ragweed pollen is distributed in the air during the fall season.

Starling flocks sometimes consist of as many as 60,000 birds.

Insects from the land make up 95% of the food of baby shad.

The Caribbean Monk Seal is one of 26 mammals recently listed by the International Union for Conservation as threatened with extinction.

Rainbow, brown, cutthroat and brook trout provide much of the sport fishing in the United States.

Increasing popularity of the paste-type tomato, rich in solids and in red color, has led to development by the U. S. Department of Agriculture of a new, high-yielding, fusarium-wilt-resistant variety called Roma.

## CHEMISTRY

# Poisoning Increases

► ADVANCES in chemical technology have been blamed as responsible in part for the increasing death rate from accidental poisoning of children.

The blame came in a report by Sidney Nobel of the newly established poison control center of Monmouth Memorial Hospital, Long Branch, N. J., at the First International Congress of Clinical Chemistry meeting in New York.

The increasing number and variety of poisoning problems confronting the hospital laboratory may be due in some degree to the advances in chemical technology that have introduced a wide range of noxious chemicals into the home area, Mr. Nobel said. He also pointed to the rapid development of new compounds that sometimes result in exposing workers to industrial toxic hazards despite precautions taken.

In an exhibit at the meeting, Mr. Nobel showed an integrated preventive program, which includes public education and close liaison between the hospital emergency room and a well equipped and competently staffed hospital laboratory.

Included is an odor reference shelf to aid

in rapid identification of those poisons possessing characteristic odors, and a master chart indicating the wide variety of colors, color combinations, shapes and sizes of proprietary and ethical pills and capsules.

Extreme caution is urged in dealing with unknown compounds. For example, an unmarked paper bag filled with grayish granules was found near a corpse. At the Monmouth Memorial Hospital poison control center, the granules were later identified as calcium cyanide.

Poisonous substances are found in such common household products as throat lozenges, shoe polish, bleach, detergents, depilatories, furniture polish, suntan lotion, and the fluid found in Christmas tree lights.

All of these have been related to children treated for poisoning at Monmouth Memorial Hospital.

The poison control center of Monmouth Memorial Hospital under the direction of Martin L. Rush, director of laboratories, is the only such center in any private hospital in New Jersey.

Working in cooperation with the United States Public Health Service, the New Jersey Department of Health, Rutgers University, and several private foundations and firms, the center provides analyses of poisons and treatment of poison victims throughout Monmouth County and information to physicians and others in the area.

Science News Letter, September 29, 1956

## MEDICINE

# Blames Heavy Smoking For Throat Ailments

► SMOKING EXCESSIVELY over a long period of time was blamed for chronic irritation of the breathing tract, degeneration of the vocal cords and leukoplakia, a disease marked by small white bumps on the lining of mouth and throat.

The blame came in a report by Dr. Linden J. Wallner of Rush Medical School, at the meeting of the International College of Surgeons in Chicago.

"Since the serious diseases do not occur in a high percentage of smokers, it may be argued that we are not justified in urging universal curtailment of smoking, a habit which seems to bring satisfaction to millions," Dr. Wallner said.

"We do have strong evidence that smoking may cause the symptoms and diseases described. When a patient complains of cough, hoarseness, burning or post nasal discharge, or presents evidence of chronic inflammation, or leukoplakia, we should urge curtailment of smoking rather than rely on gargles, sprays or antibiotics."

Science News Letter, September 29, 1956

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## MEDICINE

# Causes of Hypertension

► **OVEREATING**, gaining too much weight, then going on a reducing diet, tiring of that and overeating again may be one cause of high blood pressure with resultant heart disease and death.

Dogs on a regime that mimicked this eating cycle of the "average American citizen" ended up with a high blood pressure that stayed high even 22 months after they were back on a normal kennel diet, five scientists from Creighton University School of Medicine, Omaha, Neb., reported at the American Physiological Society meeting in Rochester, N. Y.

Twenty-two months of dog life is equivalent to almost 14 years of human life.

The five scientists reporting the studies were Dr. C. M. Wilhelmj, Darinka Shuput-Meyers, A. J. Carnazzo, Dr. C. M. Wilhelmj Jr. and Dr. H. H. McCarthy.

The studies were not designed primarily to mimic the dietary indiscretions of the American public, the scientists said. Looking back on them, however, the scientists saw that the eating cycle does closely resemble many human ones.

Trained dogs whose normal blood pressures were known were first put on long fast, and then on diets containing 50% or more of the calories from butter or beef suet. These "fat episodes" were repeated six times in 14 months.

The first abnormal response was a tendency for the blood pressure to rise during long fasts instead of falling as it does in normal dogs. The animals were then placed on high calorie diets of carbohydrate, meat and fat and became very fat.

During this period the blood pressure was much higher than it had been on the same diet before the "fat episodes."

The dogs then were put on reducing diets and lost weight, but the blood pressure began to rise instead of falling as it would in normal dogs. The blood pressure continued to rise to truly hypertensive levels and soon became fixed at the high level and independent of the diet.

"The condition now resembles human benign essential hypertension and is still present on the normal kennel diet 22 months after the end of the last 'fat episode,'" the scientists reported.

"Diets high in protein or carbohydrate have previously been studied in a similar manner, but only the animal fat diets caused an elevated blood pressure after the experimental food material was discontinued.

"These experiments suggest that diets high in animal fat plus obesity and irregular use of reducing diets may be one cause of essential hypertension."

Science News Letter, September 29, 1956

## GENERAL SCIENCE

## Science Talent Institute Begins on March 7, 1957

► **THE SCIENCE TALENT INSTITUTE** climaxing the Sixteenth Annual Science Talent Search for the Westinghouse Science Scholarships will be held on March 7 through 11 at the Hotel Statler in Washington, Watson Davis, director of SCIENCE SERVICE, has announced.

Each year, more than 20,000 high school seniors throughout the United States take part in the Search. After passing a series of eliminating hurdles, 40 of the nation's best potential research scientists are selected from among the thousands who vie for the coveted honors each year.

The five-day Science Talent Institute brings together these future scientists and enables them to meet and talk with some of the nation's leading scientists, as well as visit the many laboratories and scientific centers in and around the nation's capital. At the end of the sessions, the scholarships are awarded.

In addition to the 40 top winners, 260 young scientists are selected for honorable mention and recommended to universities for scholarships.

At a time when the country is suffering from an acute attack of scientist shortage, the Search is beginning its sixteenth year of discovering scientific talent.

Colleges, universities and technical schools have found the Science Talent Search a valuable aid in spotting above-average science students. From the first Search in 1942, they have used it as a way of giving scholarships and other financial aid.

Science News Letter, September 29, 1956

## Questions

**CHEMISTRY**—What groups of chemicals spare the crop but kill weeds? p. 200.  
How can water poisoned by radiation be made safe to drink? p. 205.

□ □ □

**GENERAL SCIENCE**—When is Science Youth Month? p. 198.  
What is the extent of Federal aid to college students? p. 201.

□ □ □

**MEDICINE**—How can the heart's output now be charted? p. 205.

□ □ □

**PHYSICS**—What new anti-particles may be discovered? p. 199.  
How can atomic radiation be converted directly into chemical energy? p. 200.

□ □ □

**PHOTOGRAPHS:** Cover, Westinghouse Research Laboratories; p. 195, National Bureau of Standards; p. 197, Cornell Aeronautical Laboratory-Liberty Mutual Insurance Company; p. 198, University of California College of Agriculture; p. 199, National Carbon Company; p. 202, Connecticut General Life Insurance; p. 208, Croch-Aid Co.

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by A. H. Russell

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✿ **WINDOW ATTACHMENTS** are designed to eliminate sash cords and weights. Fitted to the sash, the metal device permits the removal of the entire window for washing. The kit includes four units plus two zinc strips for covering the pulley openings and a sash plug.

Science News Letter, September 29, 1956

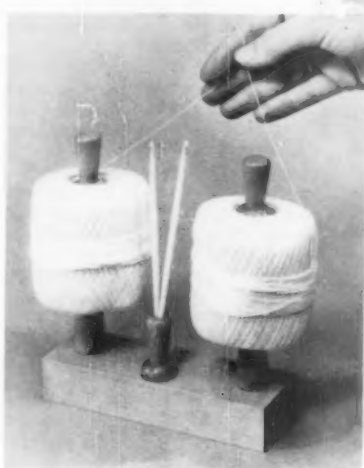
✿ **CALKING GUN** for the do-it-yourself repairman is described as eliminating dripping and splatting. Providing instant shut-off, the gun-cartridge combination tool has a pistol grip and trigger for easy handling. One cartridge will produce 15 to 20 linear feet of calking bead.

Science News Letter, September 29, 1956

✿ **MICRO-FILM READER** can be dismantled for rapid transportation. A British invention, the portable reader is designed for the projection of 35 mm or unperforated 42 x 32 mm film. Made from light alloys, it weighs 19 pounds and is lighted by a 300-watt, 230-volt projection lamp.

Science News Letter, September 29, 1956

✿ **CROCHETING AID**, shown in the photograph, is a thread holder and automatic reel. A combination of brass and rubber fittings, it unreels at the right ten-



sion to produce perfect stitches. Holding two balls of thread, it can be used as a single or double unit, for working two colors or the same color. Preventing unraveling, the device takes any size ball.

Science News Letter, September 29, 1956

✿ **PLASTIC PIPE PLUG** to prevent internal corrosion of stored pipe and tubing is made of neoprene. The slip-over and roll-on end caps seal out air, moisture, corrosive fumes and dust, and keep out small animals. Both a light- and a heavy-weight cap are available.

Science News Letter, September 29, 1956

✿ **SEWING BASKET** for little girls from six to twelve combines child training with fun. Contained in a kit, the junior-miss seamstress basket contains a pin cushion, needle, sampler, embroidery hoop, scissors, thimble and floss.

Science News Letter, September 29, 1956

✿ **SPARK ARRESTOR** for oil drum trash cans keep sparks and fly ash in the can. Made of heavy galvanized sheet metal, the safety lid has a 14-inch section with 1,403 3/16-inch holes. The lid for trash barrels also has a five-inch aluminized steel handle.

Science News Letter, September 29, 1956

✿ **BATH HEAD REST** is made of quilted rubber and filled with shredded latex. Hair is kept dry while bathing and reading in the bathtub is made easier. The head rest is held in place by suction cups.

Science News Letter, September 29, 1956

## By HORACE LOFTIN

### ✿ WHAT has happened to the summer?

Even though the days may remain hot, there is a new coolness in the night. The rains put a chill into the air that was absent only a few weeks ago. Leaves take on tints of color now, causing reds and browns and yellows to mingle with summer's green hue.

Birds that relished solitude a short time ago have suddenly come together in small or large flocks. They have a new set of sleek feathers and their bodies are plump with fat.

Even humans seem to have shaken off something of their summer lethargy to walk with a brisker step.

A change is in the air, the coming of the season that prepares for an even greater change. Autumn is here.

Already there have been news reports

## Autumn Changes



that the first snows of this season have fallen on mountain and northern states. Those creatures of the regions where autumn is brief and winter comes early have already made their arrangements for the period of snow, ice and little food. In the more temperate areas, the autumn change at hand has signaled the start of preparations for winter.

The grasshopper who persists in singing even into the autumn will die soon, her hopes for the future resting in eggs carefully laid in the protective earth. The ant and other provident creatures, such as the squirrel, are busier than ever now, storing food in the pantry for the long winter. Others, such as the bear, combine forethought with pleasure as they devour great quantities of food to be stored as body fat and used during the winter sleep.

In the far south, autumn is not taken so seriously by many animals. It is just a pleasanter time to live—not too hot, not too cold. Winter holds little terror for them, since there will probably be enough food for all, including the migrant birds and animals that move south in winter.

It is interesting to remember that bird watchers "down south" rival each other to see the first robin of the season, a sure sign that winter is not far away—up north!

Science News Letter, September 29, 1956